

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An electrochemical deposition chamber for depositing material onto microfeature workpieces, the chamber comprising:
 - a processing unit including a first flow system configured to convey a flow of a first processing fluid to a microfeature workpiece;
 - a barrier unit having an upper portion with an upper channel in fluid communication with the first flow system of the processing unit, a lower portion with a lower channel, and a first external outlet at the upper portion in fluid communication with the upper channel, wherein the upper portion is detachably mounted to the processing unit such that the barrier unit is below the processing unit and the first processing fluid flows out of the chamber via the first external outlet;
 - an electrode unit releasably coupled to the lower portion of the barrier unit such that the electrode unit is below the barrier unit and spaced apart from the processing unit, the electrode unit including an electrode and a second flow system configured to convey a flow of a second processing fluid at least proximate to the electrode, wherein the lower channel of the barrier unit is in fluid communication with the second flow system of the electrode unit; and
 - a nonporous barrier at between the upper portion and the lower portion of the barrier unit to separate the first and second processing fluids, the nonporous barrier being a material that allows either cations or anions to pass through the barrier between the first and second processing fluids.
2. (Withdrawn) The chamber of claim 1 wherein the nonporous barrier is an anion-selective exchange barrier that inhibits cations from passing between the first and second processing fluids.

3. (Original) The chamber of claim 1 wherein the nonporous barrier is a cation-selective ion exchange barrier that inhibits anions from passing between the first and second processing fluids.
4. (Original) The chamber of claim 1 wherein the nonporous barrier is flexible.
5. (Original) The chamber of claim 1 wherein the nonporous barrier separates the flow of the first processing fluid from the flow of the second processing fluid.
6. (Original) The chamber of claim 1 wherein the nonporous barrier allows electrical current to pass therethrough in the presence of an electrolyte.
7. (Original) The chamber of claim 1, further comprising:
the first processing fluid, wherein the first processing fluid includes a catholyte; and
the second processing fluid, wherein the second processing fluid includes an anolyte.
8. (Currently Amended) The chamber of claim 1, further comprising:
~~the a first quick-release mechanism securing the upper portion of the barrier unit to the processing unit processing fluid, wherein the first processing fluid has a concentration of between approximately 10 g/l and approximately 200 g/l of acid; and~~
~~the a second quick-release mechanism securing the electrode unit to the lower portion of the barrier unit processing fluid, wherein the second processing fluid has a concentration of between approximately 0.1 g/l and approximately 200 g/l of acid.~~
9. (Currently Amended) The chamber of claim 8 wherein ~~the second processing fluid has a concentration of between approximately 0.1 g/l and approximately~~

1.0 g/l of acidthe first-quick release mechanism has a first clamp ring and a first latch and the second quick-release mechanism has a second clamp ring and a second latch.

10. (Currently Amended) The chamber of claim 1, further comprising:
the first processing fluid, wherein the first processing fluid has a first concentration of acid; and
the second processing fluid, wherein the second processing fluid has a second concentration of acid, the ratio of the first concentration to the second concentration being between approximately 1:1 and approximately 20,000:1.

11. (Currently Amended) The chamber of claim 1 wherein the electrode unit further comprises a plurality of electrodes and the barrier extends across the barrier unit over the plurality of electrodes at a canted angle.

12. (Currently Amended) The chamber of claim 1 wherein:
the electrode is a first electrode;
the electrode unit further comprises a second electrode; and
the chamber further comprises a dielectric divider between the first electrode and the second electrode; and
the barrier extends across the barrier unit above the first and second electrodes at a canted angle.

13. (Original) The chamber of claim 1, further comprising a field shaping module to shape an electrical field in the first processing fluid induced by the electrode.

14. (Original) The chamber of claim 1 wherein the nonporous barrier is canted relative to the processing unit to vent gas from the second processing fluid.

15. (Original) The chamber of claim 1, further comprising a barrier unit coupled to the processing and electrode units, the barrier unit including the nonporous barrier.

16. (Original) The chamber of claim 1 wherein:

the nonporous barrier includes a first side and a second side opposite the first side;
the first flow system is configured to flow the first processing fluid at least proximate to the first side of the nonporous barrier; and
the second flow system is configured to flow the second processing fluid at least proximate to the second side of the nonporous barrier.

17. (Original) The chamber of claim 1 wherein the electrode comprises a pure copper electrode.

18. (Original) The chamber of claim 1 wherein the electrode comprises a copper-phosphorous electrode.

19. (Previously Presented) An electrochemical deposition chamber for depositing material onto microfeature workpieces, the chamber comprising:

a head assembly including a workpiece holder configured to position a microfeature workpiece at a processing site and a plurality of electrical contacts arranged to provide electrical current to a layer on the workpiece; and

a vessel including a processing unit for carrying one of a catholyte and an anolyte proximate to the workpiece, an electrode unit having a plurality of electrodes and an upper portion canted at an angle relative to the processing unit, and the electrode unit being configured to carry the other of the catholyte and the anolyte at least proximate to the electrode, and the vessel further including a semipermeable barrier between the processing unit and the electrode unit, wherein the semipermeable barrier selectively inhibits one of anions and cations from passing between the catholyte and the anolyte and the

semipermeable barrier is canted at the angle of the upper portion of the electrode unit.

20. (Original) The chamber of claim 19 wherein the semipermeable barrier is either a cation-selective ion exchange barrier or an anion-selective ion exchange barrier.

21. (Original) The chamber of claim 19 wherein the semipermeable barrier separates a flow of the catholyte from a flow of the anolyte.

22. (Previously Presented) The chamber of claim 19, further comprising a barrier unit coupled to a lower portion of the processing unit and an upper portion of the electrode unit, the barrier unit having a lower portion canted at the angle of the upper portion of the electrode unit, and the barrier unit including the semipermeable barrier.

23. (Currently Amended) A reactor for wet chemical processing of microfeature workpieces, the reactor comprising:

a processing unit for providing a first processing fluid to a microfeature workpiece;
an electrode unit including an electrode and being positioned below the processing unit;

a barrier unit having an upper portion mounted to a lower portion of the processing unit and a lower portion mounted to an upper portion of the electrode unit, the barrier unit including either a semipermeable cation-selective ion exchange barrier or a semipermeable anion-selective ion exchange barrier, and the barrier being releasably attached to the upper portion of the electrode unit by a quick-release mechanism having a latch;

a first flow system for carrying the first processing fluid, the first flow system including a first portion in the processing unit, and a second portion in the upper portion of the barrier unit in fluid communication with the first portion in

the processing unit, and an external outlet at the upper portion of the barrier unit; and

a second flow system for carrying a second processing fluid at least proximate to the electrode, the second flow system including a first portion in the electrode unit and a second portion in the lower portion of the barrier unit in fluid communication with the first portion in the electrode unit, wherein the ion exchange barrier separates the first processing fluid in the upper portion of the barrier unit first flow system from the second processing fluid in the second flow system lower portion of the barrier unit.

24-48. (Canceled)